

COMMENTARY

WORKPLACE SUN PROTECTION POLICIES COULD REDUCE SKIN CANCER RATES IN GENETICALLY SUSCEPTIBLE POPULATIONS LIVING AT LOW LATITUDES

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Population-based studies show actinic keratoses (AK) and carcinomas of the squamous and basal cells (referred to as epithelial skin cancers) are prevalent in genetically susceptible populations living at low latitudes (Scotto et al., 1974; Staples et al., 1998), where high levels of ambient solar ultraviolet radiation (UVR) are generally experienced throughout the year (Altmeyer et al., 1997). This partly explains why Townsville, in North Queensland (NQ), Australia, is reported to have the highest rates of epithelial skin cancers (ESC) in the world (Buettner & Raasch, 2001). While ESC have a low fatality rate (Nixon et al., 1986), they can cause considerable personal morbidity (Wong et al., 2003) and financial cost (Miller and Weinstock, 1994). Appropriate interventions are needed to reduce the incidence of ESC in the NQ population, and in other parts of the world where genetically susceptible populations reside at low latitudes. As a consequence the question arises, what would be the most appropriate intervention to reduce the incidence of ESC in such regions? A study conducted in Townsville in 1999, found that men were twice as likely as women to develop a skin cancer (Buettner & Raasch, 2001), and three times as likely to experience multiple skin cancers (Raasch & Buettner, 2002). In fact, all studies of ESC in Caucasian populations show higher rates in men than women, suggesting that men should be the primary target group of any such intervention program.

The results of two more recent studies of skin cancer in NQ suggest that ESC intervention programs should specifically target men who work outdoors. One of these studies included men who had previously had a skin cancer excised (Woolley et al., 2002), and the other included predominantly male recreational boat users (Woolley & Buettner, 2010). Both studies found that men who typically worked outdoors for at least one hour per day reported significantly more skin lesions than those who worked outdoors less often. Other population-based and case-control studies have also demonstrated that outdoor workers are significantly more likely to develop basal cell carcinomas and squamous cell carcinomas compared to indoor workers (Radespiel-Tröger et al., 2009; Armstrong & Kricger, 2001; Gallagher et al., 1995a; Naldi et al., 2000).

Poor sun protective behaviours over long periods of time appear to be the major reason why men who work outdoors in NQ are at increased risk of developing ESC. In the study of NQ men with a previously excised skin cancer (Woolley et al., 2002), outdoor workers were no more likely than indoor workers to follow sun protection recommendations; that is, wear wide brimmed hats, long-sleeved shirts and apply sunscreen (AAD, 1987).

It is now widely accepted that ESC are caused by chronic or episodic over-exposure to solar UVR, as evidenced by a dark

suntan, skin redness and sunburn (Armstrong & Kricger, 2001; Gallagher et al., 1995a; Naldi et al., 2000; Gallagher et al., 1995b; Kricger et al., 1995a; Kricger et al., 1995b). The link between sunburn and skin cancer has been widely publicized in NQ through SunSmart media campaigns ("don't sizzle like a sausage"), as has the statement that Townsville is "the skin cancer capital of the world". The question is, why aren't NQ outdoor working men adequately protecting themselves from the sun at work, even if, as research showed, they had previous ESC excised?

A recent qualitative study of the differences between NQ men and women's skin cancer prevention knowledge, attitudes and behaviours shed some light on this question (Woolley, unpublished data). This study found that while young women often deliberately sought a tan, by their mid-twenties, nearly all women used the recommended combination of sun protection practices whenever they went in the sun for longer periods, and avoided the sun during midday hours. Investigations uncovered that women had various concerns about sun exposure: (1) the danger associated with melanoma; (2) premature aging of the skin from having a suntan or sunburn; and (3) scarring from skin cancer excision. Women also had very accurate knowledge about the causes and prevention of ESC, often as a result of reading health-related articles in magazines.

Men, in contrast, rarely reported using recommended sun protective behaviours when out in the sun for periods longer than thirty minutes. Even when participating in high-sun exposure activities where unprotected exposure was likely to result in sunburn, many men admitted to using sun protection only after their skin had turned red from the sun. The study found men had far fewer concerns than women about experiencing a suntan, sunburn or ESC. Men often preferred to have a tan because they considered a tan gave them a more masculine appearance, as did scarring that may result from skin cancer excision. Relatively few men in the study believed that skin cancer was caused by skin redness or having a dark suntan; however, many considered developing ESC to be an acceptable risk associated with work or an outdoor lifestyle, thought that ESC were easily treated by excision, and melanoma was only dangerous if discovered late when already spreading.

Many men, particularly when younger, admitted to having a risk-taking attitude and succumbing to negative peer influences from friends and work colleagues regarding their use of sun protection. Neglecting sun protection seemingly provides an appearance of bravado against a potentially fatal, though unlikely, scenario of developing melanoma later in life. Many outdoor workers also mentioned annoyances associated with using protection (e.g., long sleeved shirts are hot and uncomfortable to wear over the

humid summer months; sunscreen stings if it gets in your eyes when you sweat and makes your hands slippery and difficult to hold tools).

How can we establish more adequate and regular use of sun protection in men who work outdoors and experience high levels of sun exposure, day after day? The literature shows that trying to improve men's sun protection habits using interventions based on knowledge-change (Cody & Lee, 1990; Johnson & Lookingbill, 1984; Katz & Jernigan, 1991; Geller et al., 2001; Azizi et al., 2000; Borland et al., 1991; Gergis et al., 1994; Lombard et al., 1991; Glanz et al., 2001), fear appeals (Keesling & Friedman, 1995), or gain-framed messages based on either appearance (Jones & Leary, 1994; Weinstock et al., 2002) or health (Detweiler et al., 1999) have resulted in only minor or short-term increases in sun-protective intentions and practices. The findings of our qualitative study may explain why this is so – men often have erroneous beliefs about the causes of skin cancer, they perceive ESC as easy to treat and not serious, and they report a variety of psycho-social barriers, yet relatively few appearance- or health-based motivators to use sun protection.

It is obvious that simply improving men's knowledge or providing them with sunscreen, hats and long sleeved shirts will not be sufficient to overcome these many factors. Therefore, a social engineering approach – making it mandatory for people to undertake a protective health behaviour (e.g., wear a seatbelt) or not indulge in unhealthy practices (e.g., ban smoking in public places) – may be the only intervention that will successfully improve sun protection in NQ outdoor working men and reduce their likelihood of developing ESC long term.

This suggestion is supported by evidence from a study conducted in Townsville in 2005 which showed that employees working under a mandatory sun protection policy (required to wear a long sleeved shirt and wide brimmed hat when working in the sun) had significantly less sun-induced skin damage than employees working under a voluntary workplace policy (Woolley et al., 2008). Specifically, employees from the organization with the mandatory sun protection policy had significantly lighter suntan levels on their right forearm and hand, fewer AK on their right forearm, and reported fewer recent sunburns and previously excised skin cancers. These differences are a likely consequence of outdoor working employees being made to use recommended sun protection practices over a long period of time.

Therefore, this commentary strongly recommends that workplaces situated in tropical regions with predominantly Caucasian populations adopt a much more serious commitment to skin cancer prevention. Men's erroneous beliefs, the strength of their barriers and lack of motivators for using sun protection suggest it is no longer sufficient merely to provide sunscreen in the workplace, or give employees a choice of whether or not to use sun protective clothing when working outdoors. Instead, workplaces should consider enforcing a mandatory workplace sun protection policy for all who work outdoors in NQ, and workplaces should at least strongly advocate for, or make freely available, sunscreen sun-glasses and sun-gloves.

Implementing such workplace measures at lower latitudes will significantly reduce the sun-induced skin damage sustained by outdoor workers over their working life, and should also abate the development of ESC in those who are genetically susceptible.

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